

REMARKS

The present amendment is in response to the Office Action, dated February 3, 2003, where the Examiner has rejected claims 1-20. By the present amendment, claims 1, 5-8, 12, 14, 15 and 18-20 have been amended. Accordingly, claims 1-20 are pending in the application. Reconsideration and allowance of pending claims 1-20 in view of the amendments and the following remarks are respectfully requested.

A. Rejection of Claims 5, 6, 12, 18 and 19 Under 35 USC §112

The Examiner has rejected claims 5, 6, 12, 18 and 19 under 35 USC §112, Second Paragraph, as being in indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Applicant has amended claims 5, 6, 12, 18 and 19 by replacing the phrase “bond pad is specialized” with the phrase “bond pad is not used to establish an electrical connection between said semiconductor die and a substrate.” Applicant respectfully submits that the rejection of claims 5, 6, 12, 18 and 19 under 35 USC §112, Second Paragraph has been traversed, and therefore claims 5, 6, 12, 18 and 19 should now be allowed.

B. Rejection of Claims 1-20 Under 35 USC §102

The Examiner has rejected claims 1-20 under 35 USC §102 as being anticipated by Merrill, et al. (USPN 5,886,393) (“Merrill ‘393”). Applicant respectfully disagrees; however, in order to expedite the prosecution of this application, applicant has amended independent claim 1 to specify that the bonding wire has an inductance defined by at least

a first selected dimension of said bonding wire, wherein said first selected dimension is measured along a first axis substantially perpendicular to said top surface of said semiconductor die. Independent claims 8 and 15 have also been amended to specify similar limitations. For the reasons that follow, applicant respectfully submits that claims 1-20 are patentably distinguishable over Merrill '393.

The present invention, as defined by independent claims 1, 8 and 15, are directed to an off-chip inductor, wherein the inductance of the inductor can be accurately determined and controlled. As specified by independent claims 1, 8, and 15, the inductance of the bonding wire, i.e., the inductor, is defined by at least a first selected dimension of said bonding wire, wherein said first selected dimension is measured along a first axis substantially perpendicular to said top surface of said semiconductor die. As discussed in the present application, this first selected dimension is also described as "loop height 128" of bonding wire 118. In this way, for a given distance 130 (which corresponds to the distance between the centers of semiconductor die bond pad 124 and semiconductor die bond pad 126), the length of inductor 116 can be increased or decreased by increasing or decreasing loop height 128 of bonding wire 118.

In contrast, Merrill '393 does not provide an inductor wherein the inductance of the inductor is determined and controlled by means of a first selected dimension is measured along a first axis substantially perpendicular to said top surface of said semiconductor die. Instead Merrill '393 discloses various embodiments, wherein the inductance of the bond wire is strictly controlled by the distances between bonding terminals pad, e.g., bonding terminal pads 172a, 172b, 172c and 172d in Figure 5 of

Merrill '393. Thus, the inductance of bonding wire 173a, for example, corresponds to the distance between bonding terminal pads 172a and 172b, where distance between bonding terminal pads 172a and 172b is measured along an axis parallel to the surface of die 128. The same is true of bonding wires 173b, 173c and 173d in Figure 5 of Merrill '393. Thus, Merrill '393 is strictly limited to controlling inductance by a dimensional axis parallel to the surface of die 128, and neither discloses nor suggests that the inductance of the inductor is determined and controlled by means of a first selected dimension is measured along a first axis substantially perpendicular to said top surface of said semiconductor die.

The Examiner further cites Col. 5, lines 3-34 of Merrill '393 stating that "Merrill teaches wherein an inductance of the inductor is increased by increasing a loop height of the bonding wires 173a-173d, and wherein the inductance of the inductor is decreased by decreasing said loop height of the bonding wire (Page 4 of the Detailed Action). Merrill '393, however, does not disclose or suggest controlling inductance by selection of a loop height. Instead, Merrill '393 provides that the inductance is determined by the bond wire length, not the bond wire height (see, e.g., col. 5, lines 5-8). As discussed above, Merrill '393 measures bond wire length by the distance between bonding terminal pads, which is measured along a dimensional axis parallel to the surface of die 128. In contrast, "loop height" as used in the present application, relates to a selected dimension which is measured along an axis substantially perpendicular to the top surface of the semiconductor die (see, e.g., loop height 128 in perspective view of inductor 116 in Figure 1 of the present application). No such feature is disclosed or remotely suggested

by Merrill '393. While Merrill '393 discloses that the inductance is at least in part a function of the area enclosed by the inductor loop, the inductor loop in Merrill '393 lies along a dimensional plane parallel to and not perpendicular to the surface of die 128. As such, Merrill '393 is a significant departure from the inductor and method specified by independent claims 1, 8 and 15. Accordingly, it is respectfully submitted that rejection of independent claim 1 and its corresponding dependent claims 2-7, independent claim 8 and its corresponding dependent claims 9-14, and independent claim 15 and its corresponding dependent claims 16-20 has been traversed, and therefore, claims 1-20 should be allowed.

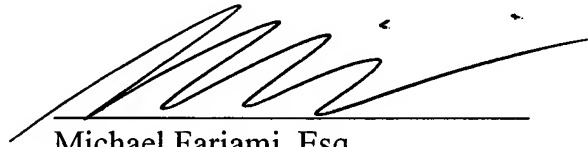
C. Conclusion

For all the foregoing reasons, an early allowance of claims 1-20 pending in the present application is respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully Submitted;
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1, 5-8, 12, 14, 15 and 18-20 have been amended as follows:

1. (Once amended) A structure comprising:
 - a semiconductor die having a source bond pad and a destination bond pad attached to a top surface of said semiconductor die;
 - a stud bump, said stud bump being situated on said destination bond pad;
 - a bonding wire providing a connection between said source bond pad and said stud bump, said bonding wire having an inductance defined by at least a first selected dimension of said bonding wire, wherein said first selected dimension is measured along a first axis substantially perpendicular to said top surface of said semiconductor die.
5. (Once amended) The structure of claim 1 wherein said source bond pad is a ~~specialized semiconductor die bond pad~~ not used to establish an electrical connection between said semiconductor die and a substrate, and wherein said destination bond pad is not used to establish an electrical connection between said semiconductor die and a substrate.
6. (Once amended) The structure of claim 1 wherein ~~said destination bond pad is a specialized semiconductor die bond pad~~ said inductance is further defined by at least

a second selected dimension of said bonding wire, wherein said second selected dimension is measured along a second axis substantially parallel to said top surface of said semiconductor die.

7. (Once amended) The structure of claim ~~2~~ 1 wherein ~~an~~ said inductance of ~~said inductor~~ is increased by increasing ~~a loop height~~ said first selected dimension of said bonding wire, and wherein said inductance ~~of said inductor~~ is decreased by decreasing ~~said loop height~~ said first selected dimension of said bonding wire.

8. (Once amended) A structure comprising:

a semiconductor die having a first semiconductor die bond pad, a second semiconductor die bond pad, and a third semiconductor die bond pad attached to a top surface of said semiconductor die;

a first conductor providing a connection between said first semiconductor die bond pad and said second semiconductor die bond pad;

a bonding wire providing a connection between said second semiconductor die bond pad and said third semiconductor die bond pad, said bonding wire having an inductance defined by at least a selected dimension of said bonding wire, wherein said selected dimension is measured along an axis substantially perpendicular to said top surface of said semiconductor die.

12. (Once amended) The structure of claim 8 wherein said first, second, and third semiconductor die bond pads are ~~specialized semiconductor die bond pads~~ not used to establish an electrical connection between said semiconductor die and a substrate.

14. (Once amended) The structure of claim ~~10~~ 8 wherein ~~an~~ said inductance of ~~said inductor~~ is increased by increasing ~~a loop height~~ said selected dimension of said bonding wire, and wherein said inductance of ~~said inductor~~ is decreased by decreasing ~~said loop height~~ said selected dimension of said bonding wire.

15. (Once amended) A method for fabricating an inductor, said method comprising steps of:

fabricating a source bond pad and a destination bond pad on a top surface of a semiconductor die;

forming a stud bump on said destination bond pad;

bonding a first end of a bonding wire to said source bond pad;

bonding a second end of said bonding wire to said stud bump;

said source bond pad being a first terminal of said inductor and said destination bond pad being a second terminal of said inductor, said inductor having an inductance defined by at least a first selected dimension of said bonding wire, wherein said first selected dimension is measured along a first axis substantially perpendicular to said top surface of said semiconductor die.

18. (Once amended) The method of claim 15 wherein said source bond pad is a ~~specialized semiconductor die bond pad~~ not used to establish an electrical connection between said semiconductor die and a substrate, and wherein said destination bond pad is not used to establish an electrical connection between said semiconductor die and a substrate.

19. (Once amended) The method of claim 15 wherein ~~said destination bond pad is a specialized semiconductor die bond pad~~ said inductance is further defined by at least a second selected dimension of said bonding wire, wherein said second selected dimension is measured along a second axis substantially parallel to said top surface of said semiconductor die.

20. (Once amended) The method of claim 15 wherein ~~an~~ said inductance of said inductor is increased by increasing ~~a loop height~~ said first selected dimension of said bonding wire, and wherein said inductance ~~of said inductor~~ is decreased by decreasing ~~said loop height~~ said first selected dimension of said bonding wire.